

REMARKS

Preliminary Matters

Claims 1-4, 6-9, and 11-12 were all the claims pending in the application. Applicant has canceled claims 3 and 7, therefore claims 1-2, 4, 6, 8-9, and 11-12 are all the claims pending in the application.

The Examiner has accepted the drawing submitted on September 28, 2006. The Examiner has also acknowledged the claim for foreign priority and receipt of the certified copy of the foreign priority document. The Examiner has also initialed the PTO/SB/08 form submitted on September 28, 2006, indicating that all of the listed references have been considered.

Applicant has amended claims 9, 11, and 12 for clarity and precision of language.

Claim Rejections - 35 U.S.C. § 103

Claims 1-4, 6-9, 11, and 12 currently stand rejected under 35 U.S.C. 103 as allegedly being unpatentable over Qi (U.S. Patent No. 6,774,497) in view of Fujimori (U.S. Pub. No. 2004/0046252).

Claim 1

Applicant has amended claim 1 to incorporate the subject matter of claim 3. Applicant submits that claim 1 is patentable over the cited references.

Claim 1 recites, in part, "the volume of said bumps is greater than the volume of said apertures." The Examiner concedes that Qi does not teach that the volume of the apertures is

greater than the volume of the bumps. However, the Examiner asserts that it would be obvious to modify Qi to make the aperture larger than the bumps because forming apertures with smaller volumes causes air bubbles to be trapped in an underfill material.

The Examiner has provided absolutely no support in the prior art for the assertion that forming an aperture having small volumes causes air bubbles to be trapped in an underfill material. This assertion is not readily apparent to one skilled in the art. It would not be appropriate for the Examiner to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known. MPEP 2144.03. On the other hand, if the Examiner is relying on personal knowledge to support the finding of what is known in the art, the examiner must provide an affidavit or declaration setting forth specific factual statements and explanation to support the finding. *See* 37 CFR 1.104(d)(2).

However, even if it were well known in the art that apertures having small volumes cause air bubbles to be trapped in the underfill material, it does not answer the relevant question. The relevant question is whether the apertures will have a volume that is greater than the volume of the bumps. Having apertures with a greater volume than that of bumps, even in the structure where the underfill resin thickness is very close to zero, prevents short-circuiting between bumps from occurring and maintains a good connection. When the volume of the bumps is greater than that of the apertures, solder bumps eventually protrude from the apertures at small underfill resin thicknesses, thereby causing short-circuiting between bumps. The Examiner's assertion only

addresses the volume of the apertures, and thus, would not provide motivation for one skilled in the art to create apertures that have a volume greater than bumps.

For at least these reasons, Applicant submits that claim 1 is patentable over the cited references.

Claim 6

Applicant has amended claim 6 to include “wherein the volume of said bumps is less than the volume of said apertures in the step for forming said bumps”, consistent with the amendment to claim 1. Applicant submits that claim 6 is patentable for analogous reasons to those discussed with respect to claim 1.

Claims 2, 4, 8-9, and 11-12

Applicant submits that claims 2, 4, 8-9, and 11-12 are patentable at least by virtue of their dependencies.

New Claims

Applicant has added new claims 13-16 to provide a more varied scope of protection and submits that they are patentable at least by virtue of their dependencies.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No.: 10/594,844

Attorney Docket No.: Q97404

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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CUSTOMER NUMBER

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